

Important Advances in Clinical Medicine

Epitomes of Progress—Radiology

The Scientific Board of the California Medical Association presents the following inventory of items of progress in Radiology. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist the busy practitioner, student, research worker or scholar to stay abreast of these items of progress in Radiology which have recently achieved a substantial degree of authoritative acceptance, whether in his own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Radiology of the California Medical Association and the summaries were prepared under its direction.

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Gray Scale Ultrasonography

ULTRASONIC CROSS-SECTIONAL TOMOGRAPHY using pulsed-echo techniques has gained wide clinical acceptance as a new diagnostic tool. The technique has been applied successfully in the differential diagnosis of a number of pathological processes involving many organ systems. Tissue differentiation by ultrasound is based on acoustic impedance discontinuity, which in turn is related predominately to differences in soft tissue elasticity and density. The first instrumentation developed for two dimensional ultrasonic imaging used storage oscilloscopes to record the reflected echoes. The major disadvantage of this type of signal recording was the limited ability to display the dynamic range of the returning echoes, that is, the amplitude information.

Recently, systems have been developed that are capable of preserving quantitatively the amplitude information. They have been termed "gray scale." At first, conventional nonstorage oscilloscopes were used for display and the image was built-up on a film by continuous exposure during the scanning period. Commercial manu-

facturers in this country have adopted a different type of recording process to preserve amplitude information. The systems make use of a television scan-converter as the temporary recording target instead of a storage oscilloscope. Magnitude information is read from the scan-converter, converted to a shade of gray and relayed to a television monitor for the final display.

With the newer signal processing, reports are already appearing in the literature confirming the anticipated improved resolution and soft tissue differentiation. Cold thyroid nodules on nuclear scans can not only be characterized as to their cyst-solid nature, but preliminary reports suggest benign versus malignant solid processes can also be differentiated. A similar type of experience has been reported with palpable breast nodules. The accuracy of placental localization is approaching 100 percent with the newer techniques. Gross congenital anomalies are more readily discovered *in utero* and hydrocephalus more accurately assessed in the neonate and early infant. A normal pancreas, which previously was rarely visualized using the older instrumentation and has always been a difficult diagnostic area with